

Abstract: This invention provides a method and an optical system for sensing and controlling the frequency for a laser with respect to an optical cavity and for sensing and controlling the length difference of interferometer paths in a two beam interferometer. A misalignment is introduced in the incident laser radiation to produce a fundamental mode (TEM00) in the cavity or interferometer and the reflection of at least one higher order mode (TEM01). A split photodetector (10) allows the interference between these two modes to be measured separately by detecting two spatially distinct portions of the single reflected beam. An error signal indicative of the difference between the fundamental mode frequency and the cavity resonant frequency is obtained by subtracting the outputs from the two parts of the photodetector.